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(56) Documents Cited

GB 2308543 A EP 0727172 A1 EP 0286203 A1  
WO 97/33510 A1 US 4669755 A

(58) Field of Search

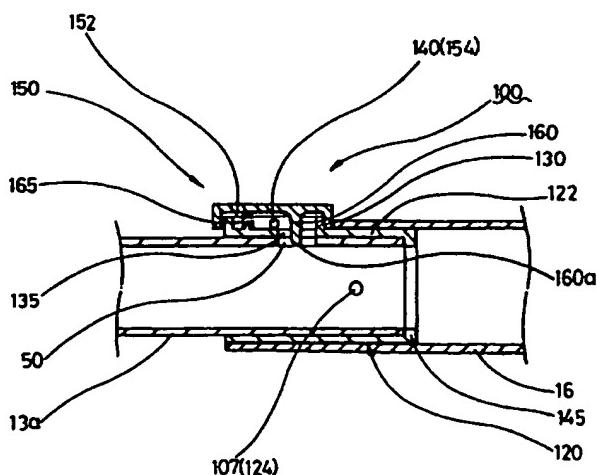
UK CL (Edition P) A4F FSCH , F2G G4A G4Z  
INT CL<sup>6</sup> A47L 5/32 5/36 9/24 , F16L 37/084 37/12  
37/127

(54) Abstract Title

Apparatus for connecting vacuum cleaner brush to wand

(57) A vacuum cleaner having an apparatus for connecting a brush is disclosed. The vacuum cleaner has a connecting pipe 120 being inserted into the end of an extention pipe 16 for drawing outside air, and a brush being equipped with a assembling pipe 13a inserted into the connecting pipe. The connecting pipe is formed with an opening 135, and the assembling pipe is formed with a fixing port 50 which is disposed at the same position with the position of the opening. A hooking member 150 is pivotably mounted at the connecting pipe. An inserting protrusion 160 of the hooking member is inserted into the opening 135 of the connecting pipe and the fixing port 50 of the assembling pipe, whereby the connecting pipe and the assembling pipe are assembled with each other. The hooking member is elastically pushed by a spring member 165. The brush is easily assembled and disassembled with small number of components.

FIG.5



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FIG. 1  
PRIOR ART

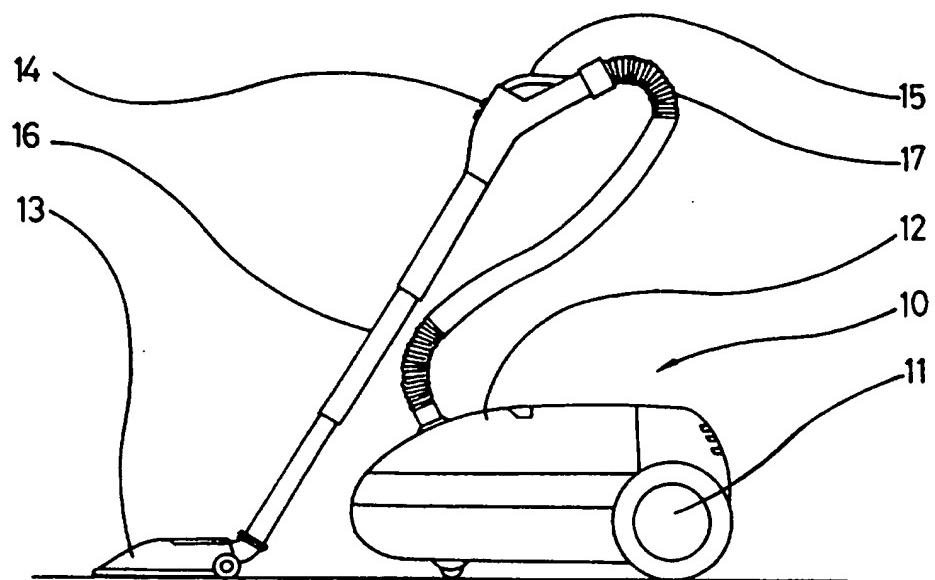


FIG. 2  
PRIOR ART

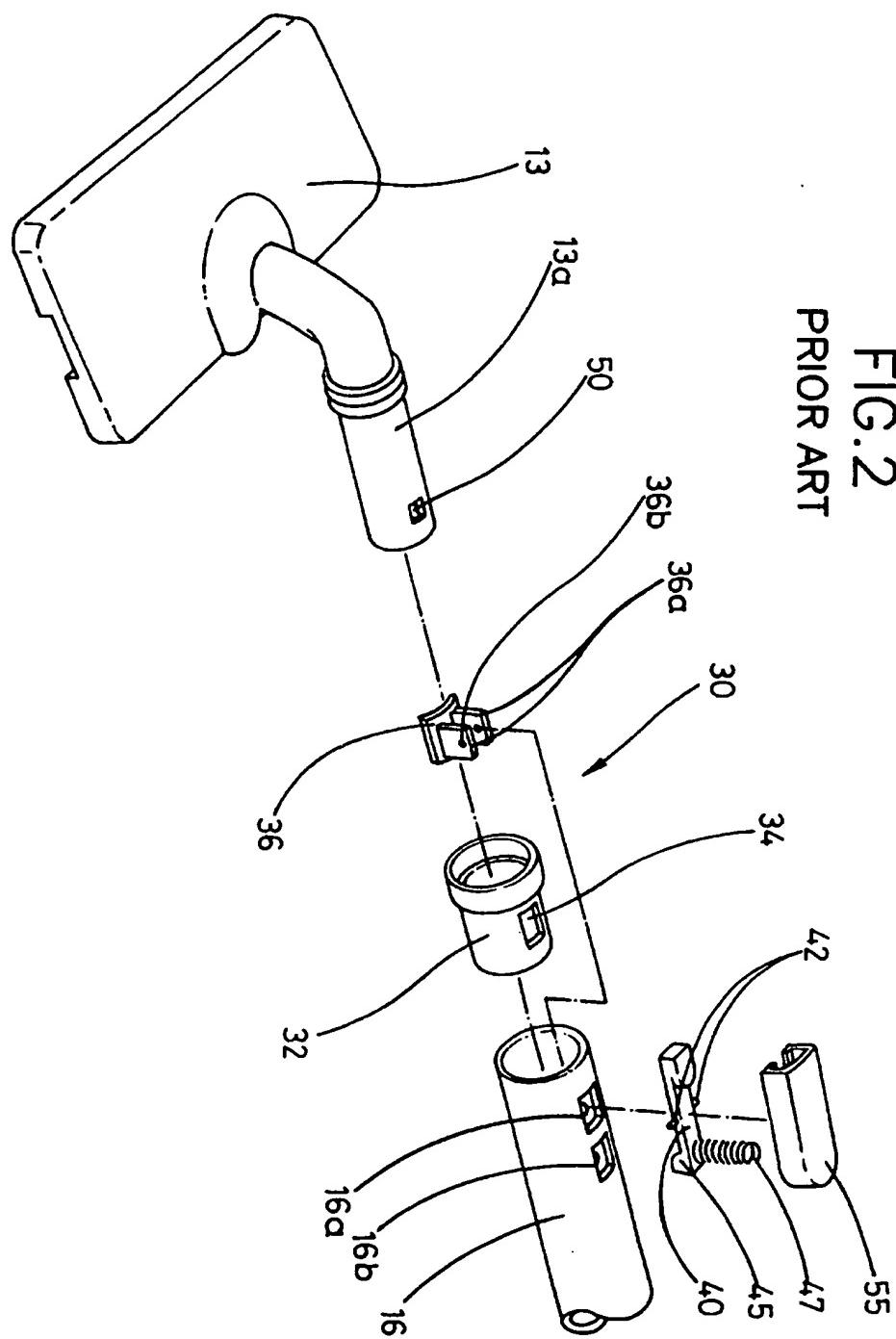


FIG.3  
PRIOR ART

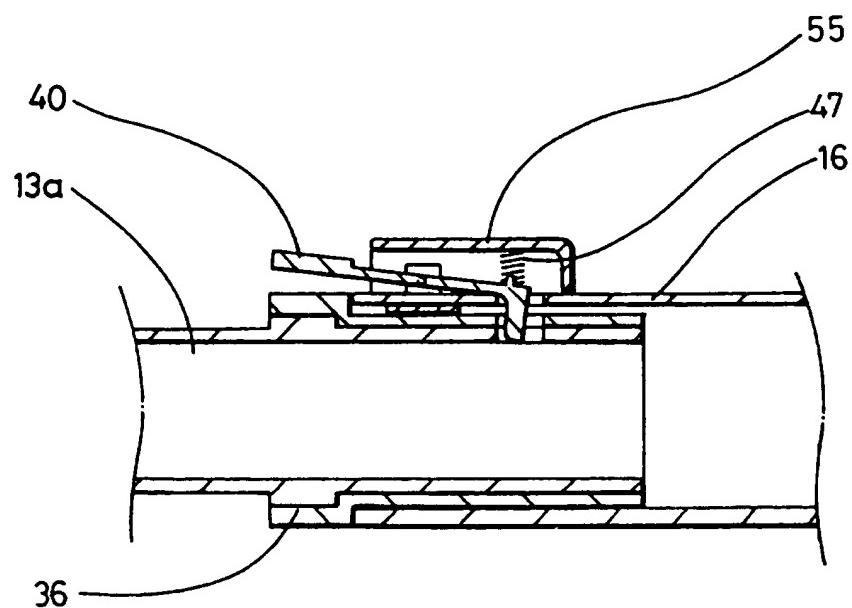


FIG. 4

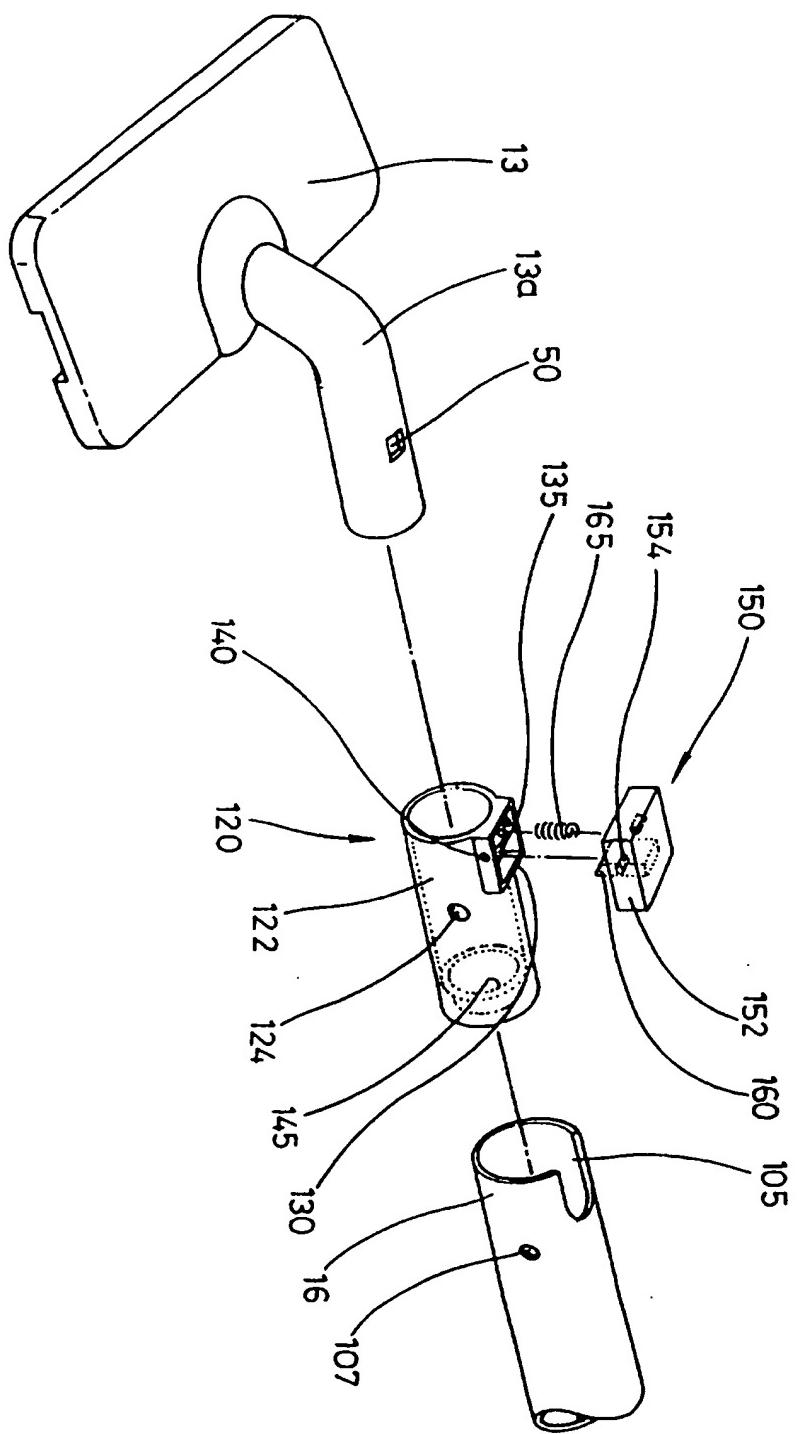


FIG.5

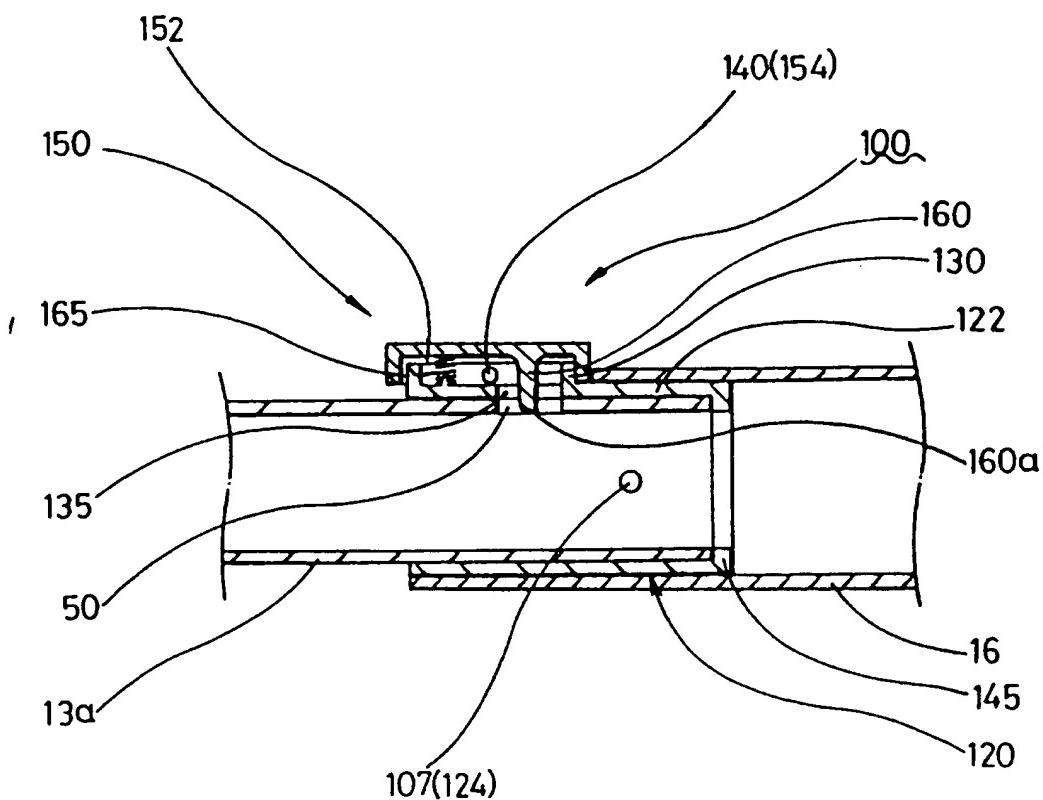
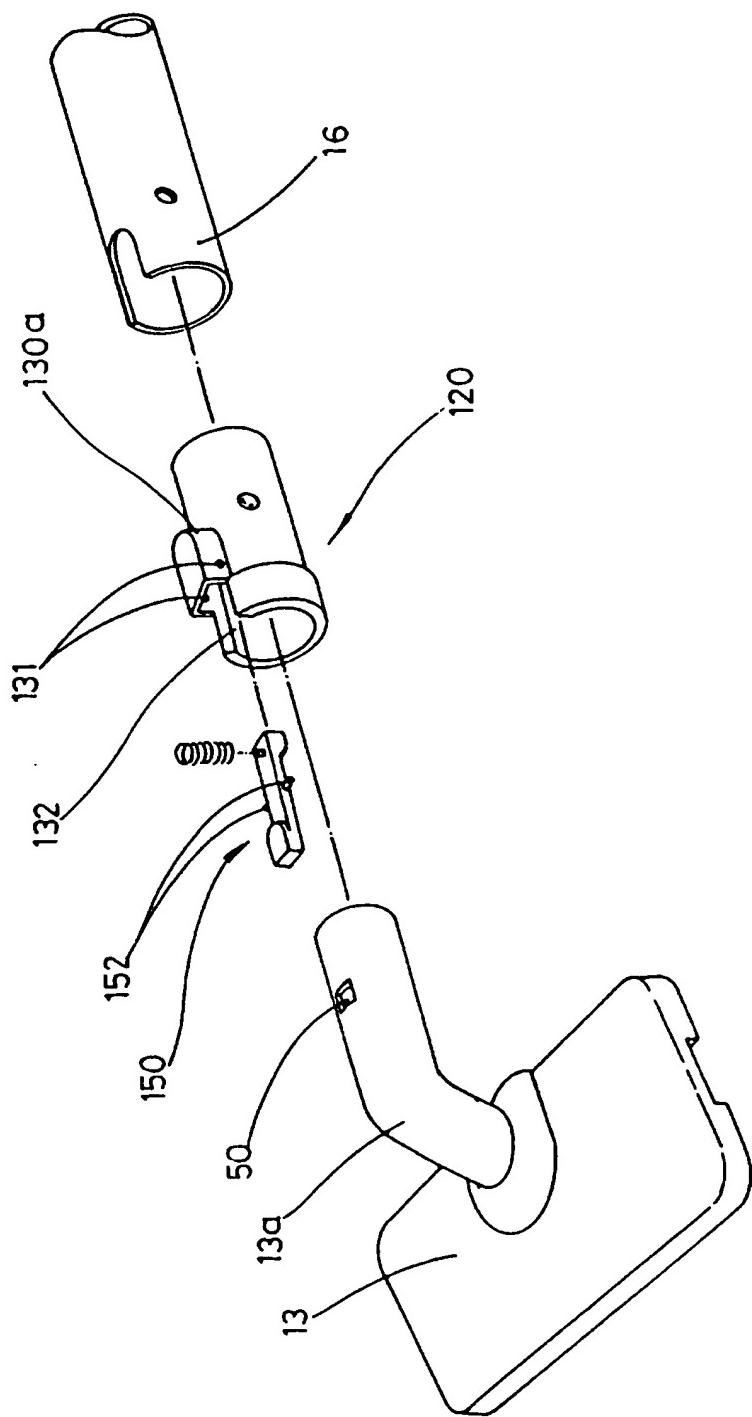


FIG. 6



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FIG.7

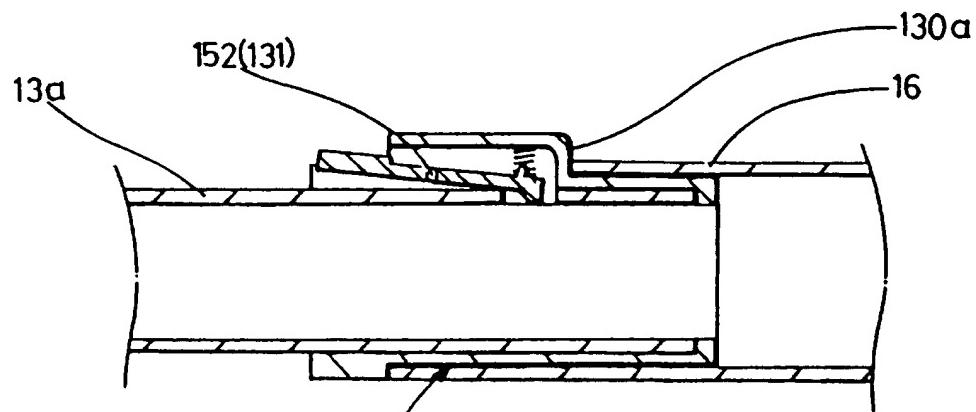
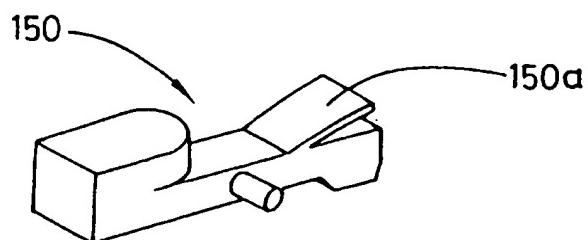


FIG.8



VACUUM CLEANER HAVING AN APPARATUS FOR CONNECTING A  
BRUSH

Background of the Invention

5           1. Field of the Invention

The present invention relates to a vacuum cleaner, and more particularly, to a vacuum cleaner having an apparatus for connecting a brush with an extention pipe which is extended from a suction pipe for drawing air from 10 an outside.

15           2. Prior Art

A general vacuum cleaner for drawing air to clean has a construction as shown in FIG. 1. In FIG. 1, the vacuum cleaner 10 comprises a body 12 having a dirt collecting chamber and a driving room to accommodate mechanical devices, a pair of wheels 11 for moving the body 12, a handle 15 having a switch 14 for controlling drawing power, a flexible suction pipe 17 connected with the handle 15 and the body 12, an extention pipe 16 extended from the handle 15, and a brush 13 installed at a free end of the extention pipe 16 for drawing dirt.

The vacuum cleaner 100 having such a constitution draws air containing dirt and impurities by the driving force of a motor in the body 12 through and with the help 25 of the brush 13. The dirt in the drawn air is filtered by a filter installed in the dirt collecting chamber, and then

the clean air is discharged outside from the vacuum cleaner  
100.

The brush 13 is connected to the extention pipe 16  
and can be detached from it. A user connects the brush 13  
5 to the extention pipe 16 when he wants to clean a wide  
place such as a floor, and disconnects the brush 13 from  
the extention pipe 16 when he wants to clean a narrow  
place. The brush 13 is repeatedly assembled or  
disassembled with the extention pipe 16 for such reasons,  
10 so the vacuum cleaner 10 is equipped with an apparatus for  
connecting and disconnecting the brush 13 with the  
extention pipe 16.

The conventional connecting apparatus comprises, as  
shown in FIG. 2, a connecting pipe 32, a fixing member 36,  
15 a hooking member 40, a spring member 47, and a hooking  
member cover 55.

The extention pipe 16 is formed with a first  
assembling port 16a and a second assembling port 16b at the  
upper peripheral side thereof.

20 The connecting pipe 32 is inserted into the  
extention pipe 16, and a third assembling port 34 is formed  
at the upper peripheral side thereof. When the connecting  
pipe 32 is inserted into the extention pipe 16, the third  
port 34 of the connecting pipe 32 is disposed at the same  
25 position with the position of the second assembling port  
16b of the extention pipe 16.

A pair of ribs 36a protrude from the fixing member 36 in parallel with each other. Respective ribs 36a are formed with holes 36a. The fixing member 36 is inserted into the first assembling port 16a from the inner side of 5 the extention pipe 16, and then the ribs 36a of the fixing member 36 are disclosed at the upper side of the extention pipe 16 through the first assembling port 16a.

The hooking member 40 is a bar which is formed with pivoting pins 42 at the central part thereof. The pivoting pins 42 of the hooking member 40 is inserted respectively 10 into the holes 36b of the ribs 36a which is disclosed through the first fixing port 16a. Thus, the hooking member 40 is pivotably fixed with the fixing member 36. At the end of the hooking member 40 is formed a inserting 15 protrusion 45.

The hooking member cover 55 covers the hooking member 40. The spring member 47 is installed at the end of the hooking member 40 where the inserting protrusion 45 is formed. The spring member 47 is supported by the hooking 20 member cover 55 to push the hooking member 40 with the springy force thereof. Thus the inserting protrusion 45 of the hooking member 40 is maintained to the inserted state into the second assembling port 16b of the extention pipe 16.

25 The brush 13 is equipped with an assembling pipe 13a. The assembling pipe 13a is formed with a fourth

assembling port 50. The assembling pipe 13a is assembled by insertion with the connecting pipe 32 which is inserted into the extention pipe 16. In that situation, the fourth assembling port 50 is disposed at the same position with 5 the positions of the second and the third assembling ports 16b, 34. Thus, in the state that the connecting pipe 32 is inserted into the extention pipe 16 and the assembling pipe 13a is inserted into the connecting pipe 32, the second, the third, and the fourth assembling ports 16b, 34, 50 are 10 disposed at the same position with each other, and then the extention pipe 16, connecting pipe 32, and the assembling pipe 13a are hooked together by the inserting protrusion 45. The brush 13 is assembled with the extention pipe 16 in such a manner.

15 If the user wants to disassemble the brush 13 from the extention pipe 16, he pushes the rear end part of the hooking member 40. The hooking member 40 then pivots against the force of the spring member 47, and the inserting protrusion 45 is released from the second, the third, and the fourth assembling ports 16a, 34, 50. Thus 20 the brush 13 is disassembled.

However, in the conventional vacuum cleaner having such a constitution, there are problems, namely, the manufacturing cost increases since the apparatus for connecting the brush 13 is comprised of many components, and the efficiency of assembling operation is low since the 25

assembling process of the connecting apparatus is too complex. That is, to assemble the brush connecting apparatus, the fixing member 36 is inserted into the first assembling port 16a of the extention pipe 16, and the 5 hooking member 40 is assembled with the fixing member 36 thereafter. Then, the spring member 47 and the hooking member cover 55 are installed, and the connecting pipe 32 is inserted into the extention pipe 16. The assembling of the connecting apparatus is performed by a lot of processes 10 as such.

Summary of the invention

The present invention has been proposed to overcome the above described problems in the prior art, and 15 accordingly it is the object of the present invention to provide a vacuum cleaner having an apparatus for connecting the brush with the extention pipe, which consists of only a few components thus reducing the manufacturing cost, and the efficiency of manufacturing process is improved to be 20 simple.

To achieve the above object, the present invention provides a vacuum cleaner comprising: an extention pipe extending from a suction pipe for drawing air from an outside; a connecting pipe being inserted into an end of 25 said extention pipe, said connecting pipe being formed with an opening at a peripheral side thereof; a brush having an

assembling pipe inserted into said connecting pipe, said  
assembling pipe being formed with a fixing port at a  
peripheral side thereof, said fixing port being disposed at  
the same position with a position of said opening of said  
5 connecting pipe when said assembling pipe is inserted into  
said connecting pipe; a hooking member being pivotably  
mounted on an outer peripheral side of said connecting pipe  
to be adjacent to said opening, said hooking member having  
inserting protrusion being inserted into said opening and  
10 said fixing port, said hooking member for fixing said  
opening and said fixing port relatively to each other  
according to pivoting positions thereof; and a means for  
elastically pushing said hooking member so that said  
inserting protrusion is maintained to an inserted state  
15 into said opening and said fixing port.

An assembling port is formed at a peripheral side of  
said extention pipe, and an assembling protrusion which  
form-fits with said assembling port is formed at a  
peripheral side of said connecting pipe. Then, said  
20 extention pipe and said connecting pipe are fixed with each  
other by said assembling port and said assembling  
protrusion.

It is preferable that a contacting side of said  
inserting protrusion with said assembling pipe when said  
25 assembling pipe is inserted into said connecting pipe is  
tilted against a inserting direction thereof.

Furthermore, a stopping rib is formed along an inner periphery of said connecting pipe in order to stop a further insertion of said assembling pipe.

5

Brief Description of the Drawings

The present invention will be better understood and its various objects and advantages will be more fully appreciated from the following description taken in conjunction with the accompanying drawings, in which:

10 FIG. 1 is a side view of a general vacuum cleaner;

FIG. 2 is a partial exploded perspective view of a vacuum cleaner which shows an apparatus for connecting the brush according to the conventional art;

15 FIG. 3 is an enlarged side sectional view of the assembled state of FIG. 2;

FIG. 4 is a partial exploded perspective view of the brush connecting apparatus according to an embodiment of the present invention;

20 FIG. 5 is an enlarged side sectional view of the assembled state of FIG. 4;

FIG. 6 is a partial exploded perspective view of the brush connecting apparatus according to another embodiment of the present invention;

25 FIG. 7 is an enlarged side sectional view of the assembled state of FIG. 6; and

FIG. 8 is another embodiment of the hooking member

shown in FIG. 7.

Detailed Description of the Preferred Embodiment

Hereinafter, the present invention will be described  
5 in detail with reference to the drawings. The same parts  
with the parts of the conventional vacuum cleaner are  
illustrated with the same reference numerals.

FIG. 4 is a partial exploded perspective view of the  
brush connecting apparatus according to an embodiment of  
10 the present invention, and FIG. 5 is an enlarged side  
sectional view of the assembled state of FIG. 4. The  
vacuum cleaner having connecting apparatus according to the  
present invention is comprised of a extention pipe 16, a  
connecting pipe 120 inserted into the extention pipe 16, a  
15 hooking member 150 installed at the connecting pipe 120,  
and an assembling pipe 13a inserted into the connecting  
pipe 120.

The connecting pipe 16 is extended from the suction  
pipe which draws air from the outside. At the end of the  
20 extention pipe 16, a notch part 105 is formed. At both  
sides of the extention pipe 16, assembling ports 107 are  
formed.

The connecting pipe 120 is inserted into the end of  
the extention pipe 16, and an opening 135 is formed at the  
25 upper peripheral side thereof. A rectangular supporting  
rib 130 is formed along the edge of the opening 135, and

holes 131 are formed at the supporting rib 130. At the side part of the connecting pipe 120 are formed assembling protrusions 124 which are form-fitted to the assembling ports 107 of the extention pipe 16.

5 When the connecting pipe 120 is inserted into the extention pipe 16, the supporting rib 130 of the connecting pipe 120 is accommodated in the notch part 105. In this situation, the assembling protrusion 124 is inserted to the assembling port 107 by form-fitting, whereby the connecting 10 pipe 120 and the extention pipe 16 are fixed with each other.

The hooking member 150 has pivoting pins 154 formed at both sides thereof, and an inserting protrusion 160 extended downwardly. The pivoting pins 154 of the hooking 15 member 150 are inserted respectively into the holes 140 of the supporting rib 130, whereby the hooking member 150 is pivotably mounted at the adjacent area to the opening 135 of the connecting pipe 120.

The hooking member 150 is pushed by the spring 20 member 165. The spring member 165 pushes one end of the hooking member 150 upwardly, whereby the inserting protrusion 160 of the hooking member 150 is inserted into the opening 135 of the connecting pipe 120.

The brush 13 is equipped with the assembling pipe 25 13a. A fixing port 50 is formed at the upper peripheral side of the assembling pipe 13a. The assembling pipe 13a

is inserted into the connecting pipe 120 which is inserted into the extention pipe 16. In that situation, the fixing port 50 is disposed at the same position with the position of the opening 135 of the connecting pipe 10. Thus, when  
5 the assembling pipe 13a is inserted into the connecting pipe 120, the inserting protrusion 160 is inserted into the opening 135 of the connecting pipe 120 and the fixing port 50 of the assembling pipe 13a, whereby the connecting pipe 120 and the assembling pipe 13a are hooked together.

10 Therefore, the brush 13 and the extention pipe 120 are fixed relatively with each other.

The contacting part of the inserting protrusion 160 with the end of the assembling pipe 13a when the assembling pipe 13a is inserted into the connecting pipe 150 is tilted  
15 against the inserting direction of the assembling pipe 13a. Thus, it is easy to insert the assembling pipe 13a into the connecting pipe 120 while the inserting protrusion 160 is inserted into the opening 135.

On the inner periphery of the connecting pipe 120 is formed a stopping rib 145. The stopping rib 145 stops further insertion of the assembling pipe 13a so that the fixing port 50 of the assembling pipe 13a and the opening 135 of the connecting pipe are disposed at the same position with each other.  
20

25 The vacuum cleaner having such a construction is assembled by installing the hooking member 150 at the

supporting rib 130 and inserting the connecting pipe 120 and the assembling pipe 13a successively. Therefore, the process for assembly is simple in comparison with the conventional vacuum cleaner. If the user wants to  
5 disassemble the brush 13, he pushes the end of the hooking member 150 to release the inserting protrusion 160 from the fixing port 50.

FIG. 6 is a partial exploded perspective view of the brush connecting apparatus according to another embodiment  
10 of the present invention, and FIG. 7 is an enlarged side sectional view of the assembled state of FIG. 6. In this embodiment, the constitutions of the extention pipe 16 and the brush 13 are the same with those in the prior embodiment shown in FIGs. 4 and 5.

15 In this embodiment, the hooking member 150 is substantially the same with that of the prior art shown in FIGs. 2 and 3. The connecting pipe 120 is opened by a cut part 132 formed at the upper peripheral side thereof, and the cut part 132 is covered by a cover part 130a. The cover part 130a is formed in a body with the connecting pipe 120. The cover part 130 is formed with holes 131 with which pivoting pins 152 of the hooking member 150 are assembled. In the present embodiment, the process for assembling and disassembling the connecting pipe 120 and  
20 the assembling pipe 13a is the same as that of the embodiment shown in FIGs. 4 and 5. According to the  
25

present embodiment, the fixing member 36 and the hooking member cover 55 shown in FIGS. 2 and 3 are not needed, so the components are simple and it is easy to assemble.

FIG. 8 is another embodiment of the hooking member  
5 shown in FIG. 7. In the embodiments shown in FIG. 4 through FIG. 7, the spring member 160 is installed to apply springy force to the hooking member 150, but it is more preferable that an elastic piece 150a is formed at the hooking member 150 in a body in order to diminish the  
10 number of components and simplify the assembling process. According to the embodiment shown in FIG. 8, the additional spring member need not be adopted by the elastic piece 150a.

As described above, according to the present  
15 invention, a vacuum cleaner is provided in which the manufacturing cost is reduced because of fewer components, and the efficiency of manufacturing process is enhanced by the simple assembling process.

Although the present invention has been described  
20 and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, wherein the spirit and scope of the present invention is limited only by the terms of the appended claims.

What is claimed is:

1. A vacuum cleaner comprising:  
an extention pipe extending from a suction pipe for  
drawing air from an outside;  
  
5 a connecting pipe being inserted into an end of said  
extention pipe, said connecting pipe being formed with an  
opening at a peripheral side thereof;  
  
a brush having an assembling pipe inserted into said  
connecting pipe, said assembling pipe being formed with a  
10 fixing port at a peripheral side thereof, said fixing port  
being disposed at the same position with a position of said  
opening of said connecting pipe when said assembling pipe  
is inserted into said connecting pipe;  
  
a hooking member being pivotably mounted on an outer  
15 peripheral side of said connecting pipe to be adjacent to  
said opening, said hooking member having inserting  
protrusion being inserted into said opening and said fixing  
port, said hooking member for fixing said opening and said  
fixing port relatively to each other according to pivoting  
20 positions thereof; and  
  
a means for elastically pushing said hooking member  
so that said inserting protrusion is maintained to an  
inserted state into said opening and said fixing port.
  
- 25 2. The vacuum cleaner as claimed in claim 1,  
wherein said pushing means is a spring member.

3. The vacuum cleaner as claimed in claim 1,  
wherein said pushing means is an elastic piece extended  
from said hooking member.

5           4. The vacuum cleaner as claimed in claim 1,  
wherein an assembling port is formed at a peripheral side  
of said extention pipe, and an assembling protrusion which  
form-fits with said assembling port is formed at a  
peripheral side of said connecting pipe, and

10           wherein said extention pipe and said connecting pipe  
are fixed with each other by said assembling port and said  
assembling protrusion.

15           5. The vacuum cleaner as claimed in claim 1,  
wherein a contacting side of said inserting protrusion with  
said assembling pipe when said assembling pipe is inserted  
into said connecting pipe is tilted against a inserting  
direction thereof.

20           6. The vacuum cleaner as claimed in claim 1,  
further comprising a stopping rib being formed along an  
inner periphery of said connecting pipe, said stopping rib  
for stopping a further insertion of said assembling pipe.

25           7. A vacuum cleaner substantially as hereinbefore  
described with reference to and/or as shown in Figures 4

**and 5; Figures 6 and 7; or Figure 8 of the accompanying drawings.**



The  
Patent  
Office

16

Application No: GB 9725538.4  
Claims searched: 1-7

Examiner: Jason Scott  
Date of search: 1 May 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): A4F (FSCH); F2G ( G4A, G4Z)

Int Cl (Ed.6): A47L (5/32, 5/36, 9/24); F16L (37/084, 37/12, 37/127)

Other: Online: WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2308543 A	DAEWOO See page 12, lines 6-20.	1 & 2
X	EP 0727172 A1	AEG See column 3, lines 29-35 and figure 1.	1
X	EP 0286203 A1	BLACK & DECKER See column 7, line 41-column 8, line 16.	1
X	WO 97/33510 A1	VORWEK See page 11, line 380 to page 12, line 394.	1, 2 & 3.
X	US 4669755	SINGER See column 2, line 52 to column 3, line 15 and fig. 3.	1, 3, 4, 5 & 6

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.